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Nova Scotia Department of the Environment

The Rebirth of Muggah Creek

AN OVERVIEW OF THE TEN YEAR 1987-97 SYDNEY TAR PONDS CLEAN-UP PROJECT

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INTRODUCTION

The Sydney Tar Ponds. They were once a panorama of Great Blue herons, marsh grass and fishing boats. Today a dark pool of oily black mud fills the site local elders remember as Muggah Creek.

Gone are the herons, but not forever.

A clean-up of the Sydney Tar Ponds is under way. Thanks to a historic 1986 federal-provincial agreement, Sydney, Nova Scotia, will be rid of this environmental blight by the mid 1990s.

The clean-up project is the largest of its kind in Canadian history, using innovative techniques for toxic waste destruction. Canada and the world will be watching with interest, and anticipation.

This booklet explains the Sydney Tar Ponds clean-up project and describes how a damaged piece of nature will in time be brought back to life.

A view of one of the Tar Ponds, looking across it towards the Sydney Steel Corporation.

AN OVERVIEW

The Sydney Tar Ponds are one of the most hazardous chemical waste sites in eastern Canada, and the largest chemical waste site in the country. More than 80 years of discharges from the coke ovens of Sydney's Sysco steel plant have turned the once pristine Muggah Creek into an enormous environmental menace.

The Tar Ponds contain compounds of a group of chemicals called polynuclear aromatic hydrocarbons, or PAHs, some of which are known cancer-causing agents. High concentrations of these PAHs have resulted in the indefinite closure of the lobster fishery in one area of Sydney Harbour.

In November of 1986, a $34.3 million federal-provincial agreement was signed to clean up the Sydney Tar Ponds and create much-needed jobs for Cape Bretoners. The ten-year toxic excavation project is the largest of its kind in Canada and the second largest clean-up of its type ever undertaken in North America.

During the clean-up operation hazardous waste from the Tar Ponds site will be excavated and then incinerated to destroy the PAHs at an expected 99.99% rate of efficiency. As a bonus, the incineration process will generate electrical energy and steam for use in various areas of the steel plant.

Besides demonstrating innovative technology that could be applied to many other environmental problems elsewhere in the world, the clean-up will have major positive spinoffs in the local area. The industrial development and tourism potential of the Sydney area will be rejuvenated. And, above all, Sydney will be a healthier place to live in the 1990s and beyond.

SYDNEY TAR PONDS CLEAN-UP

An aerial view of part of Sydney showing the Muggah Creek/ Tar Ponds area, Sysco, and Sydney Harbour. The results of decades of pollution are clearly evident in the Tar Pond in the lower right of the photo.

The Sydney Steel Plant:
LOOKING BACK

At the turn of the century the industrial revolution was moving through North America like a steam train. The demand for iron and steel products was growing throughout the world, and one of the most promising sources of supply was Sydney, Nova Scotia.

The Sydney steel operations, which began in 1899, were an outgrowth of the local coal industry. Company managers at the time believed that raw materials for steel making could be assembled at a lower cost in Sydney than anywhere else in the world. Iron ore was obtained from a large deposit at Wabana, Newfoundland; coal for the coke ovens was supplied from nearby mines; and limestone, used to remove impurities from iron ore, was quarried locally.

By 1912, nearly half of all the steel produced in Canada was made in and around Cape Breton. And as the century advanced, so did the Sydney steel plant:

- in 1921, Dominion Iron and Steel merged with the Nova Scotia Steel and Coal Company Limited to become the British Empire Steel Corporation, which in turn began to ship semi-finished steel to its other operations in Ontario and Quebec
- subsequent mergers were conducted with the Dominion Steel

A photograph, circa 1910, showing a group of workers from the Dominion Coal and Steel Company.

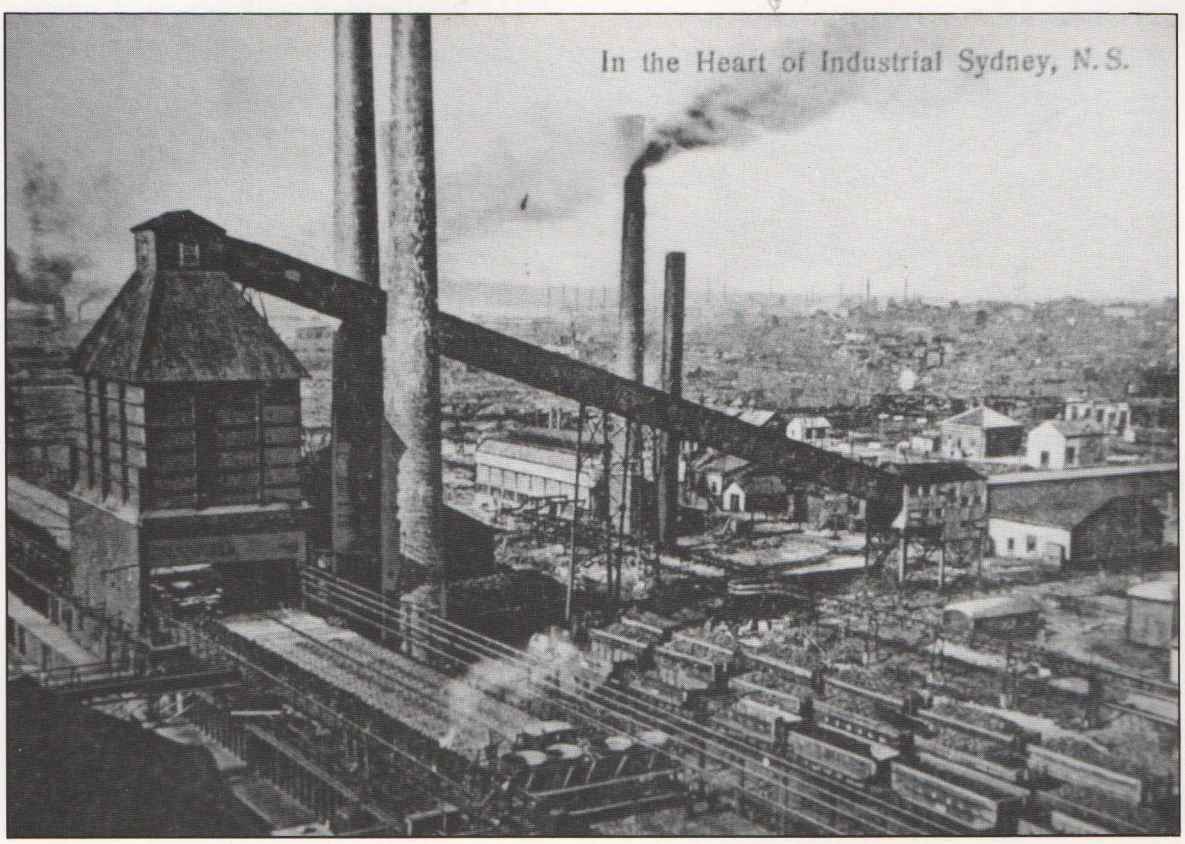
and Coal Corporation and the Hawker Siddeley Group; however, by the mid 1960s weak steel markets meant an uncertain future for the steel plant

- finally, in 1967 the steel mill was purchased by the Nova Scotia government to prevent closure by the previous owner, and it became the Sydney Steel Corporation (Sysco)

By 1980, Sysco was an integrated steel facility with a pig iron capacity of approximately 800 000 tonnes per year and a crude steel capacity of close to 900 000 tonnes per year. It was equipped with coke ovens, blast furnaces, open hearth furnaces, a bloom mill, a billet mill, a rail mill, a bar mill and continuous casting equipment.

In 1981, a first-phase $92.6 million modernization program, funded by the federal and provincial governments, was begun at the Sysco plant. It was completed in 1985. Close to $14 million of the modernization funding was spent on upgrading pollution controls in the company's blast furnaces and rolling mills.

A second-phase $157 million federal-provincial modernization program to convert the steel mill to an electric arc furnace operation was agreed to in early 1986.



A reproduction of an old postcard showing the coke ovens, where coal was burned with little or no oxygen to convert it to coke for use in the blast furnaces.

Sydney Tar Ponds:
THE PROBLEM

The Tar Ponds are as much a by-product of Cape Breton's economic history as they are a by-product of manufacturing steel. From its creation in 1899 to the present day, the steel plant in Sydney has played a vital role in the local economy. However, the economic fortunes of this home-based industry were not without environmental consequences.

The first scientific signs that the Tar Ponds are a serious environmental hazard arose in the early 1980s. At that time a series of federal and provincial studies revealed the presence of carcinogens, or cancer-causing agents, in the ponds. These include some types of polynuclear aromatic hydrocarbons—or PAHs.

Although they do occur naturally in the environment, PAHs are also a by-product of the process which converts coal into coke, and of other human activities. Absorbed through the food and water we consume, some PAHs are among the oldest known carcinogens in humans. In fact, they have been identified as an active ingredient in soot, which caused cancerous tumors in chimney sweeps in the eighteenth century.

But PAHs, unfortunately, are increasingly a twentieth century problem—especially in Sydney. And in the early 1980s reports began to zero in on a major environmental hazard on Cape Breton Island.

In 1980 and 1981, scientists from the federal Department of Fisheries and Oceans tested lobsters in Sydney Harbour, adjacent to the Sysco plant and the Tar Ponds. They discovered that levels of PAH contamination were high enough to warrant indefinite closure of the lobster fishery in the South Arm of the harbour.

In January 1982 and October 1983, Environment Canada released reports which pinpointed Sysco as the major source of pollution in the Sydney area. The reports concluded that the Tar Ponds represented an ongoing source of PAH contamination to Sydney Harbour. Subsequent federal studies found that the air downwind of the Sysco coke ovens had above-average levels of PAH contamination.

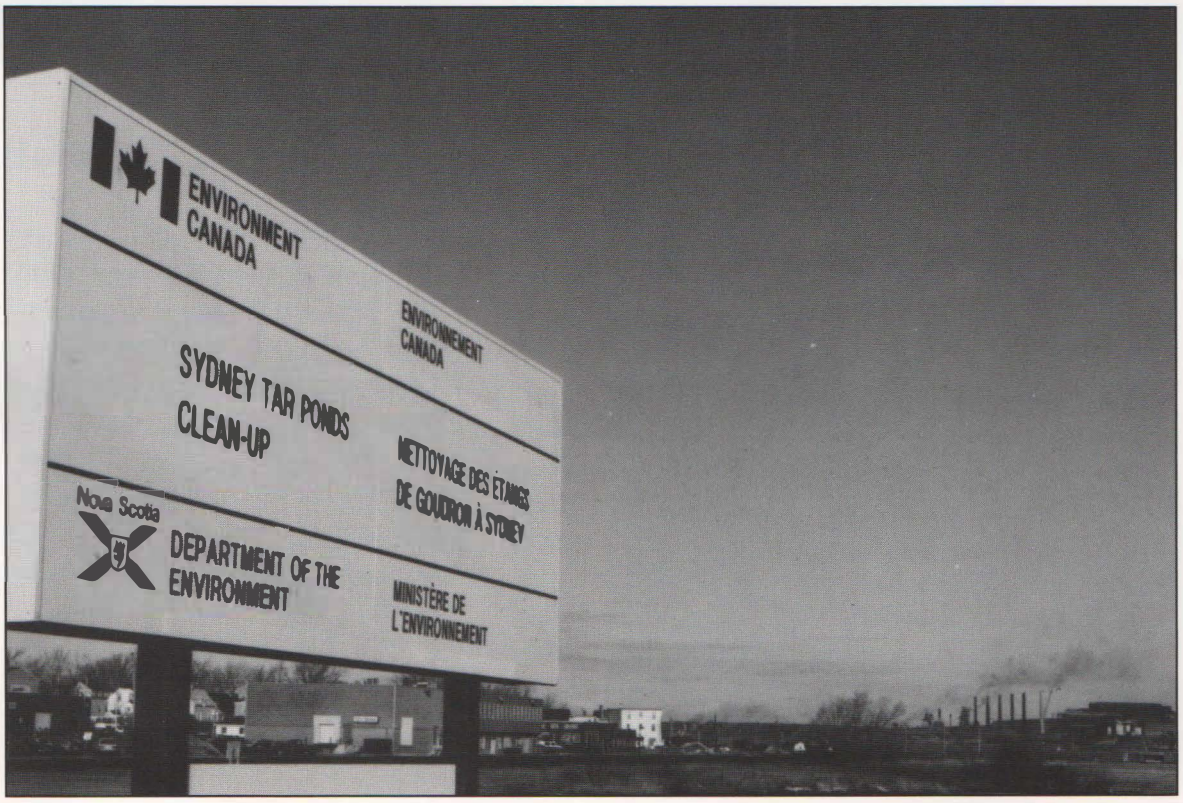
THE SOLUTION

As evidence mounted against the Tar Ponds it became clear that something had to be done to curb this growing threat to Sydney's environment. In April 1984, a contract was awarded to a private consulting firm to develop an engineering design for the long-term control and clean-up of the Tar Ponds. The resulting study presented three alternatives for the clean-up: encapsulation of the wastes on site; excavation of the wastes and their eventual disposal at a new site designed to contain hazardous wastes; or excavation and incineration of the wastes, with the possibility of generating usable energy from the process.

The third option of excavation and incineration was chosen because incineration can destroy PAHs at an expected 99.99% rate of efficiency, and because it is the most economically sound alternative.

Once the solution to the problem was clear, the federal and provincial governments initiated a plan to rid Sydney of the Tar Ponds, once and for all.

On November 7, 1986, a $34.3 million federal-provincial agreement to clean up the Sydney Tar Ponds and create badly needed jobs for Cape Bretoners was signed in Sydney by federal Environment Minister Tom McMillan, Nova Scotia Minister of Development Roland Thornhill, and Nova Scotia Environment Minister Guy LeBlanc.



Clean-up Agreement:

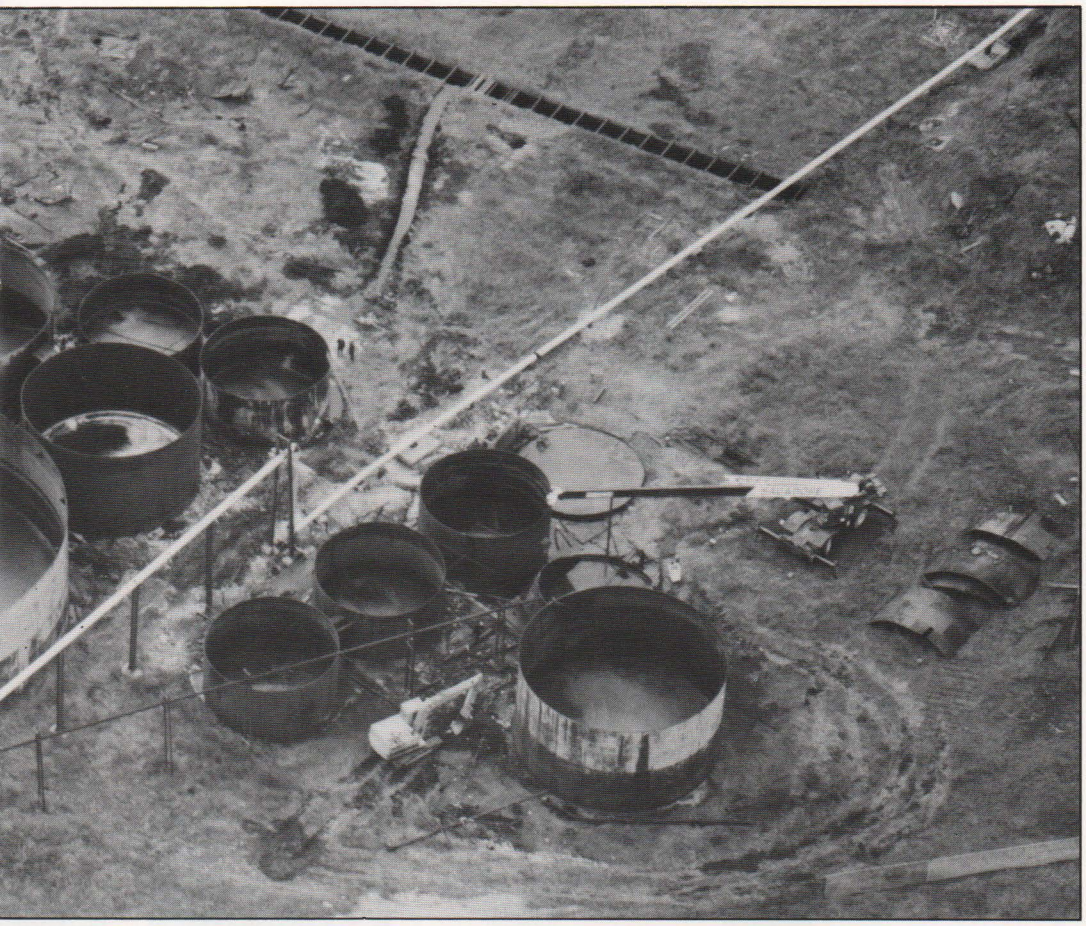
HIGHLIGHTS

- The ten-year toxic excavation project will be the largest clean-up of a chemical waste site in Canadian history.
- The first five years of the clean-up will cost $34.3 million.
- Sysco steel plant's coke ovens in Sydney, the major source of the Tar Ponds and PAH contamination, will be closed as part of the agreement.
- From the start of the project in June 1987, two and a half years of design work and preliminary site preparation will take place before the actual seven-and-a-half-year excavation begins.
- Coke oven workers will be given first right of refusal for clean-up jobs for which they qualify. They will also be assisted by the federal government in preparing for and obtaining new employment.
- The total cost of the first five years of the clean-up project will be split by the federal and provincial governments on a 70/30 percent basis.
- The clean-up agreement is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) already signed between the federal Department of Regional Industrial Expansion and the Nova Scotia Department of Development in June 1984.

The Clean-up Operation

It will take 10 years to fully clean up the Sydney Tar Ponds. There are two phases to the operation. The Tar Ponds project is unique and complex, and will require much advance preparation. For these reasons, the first phase will take two and one-half years to complete. It will include: a groundwater assessment, test burning of contaminated sediments, a quality control program, detailed engineering design, site preparation, and equipment installation.

SYDNEY TAR PONDS CLEAN-UP



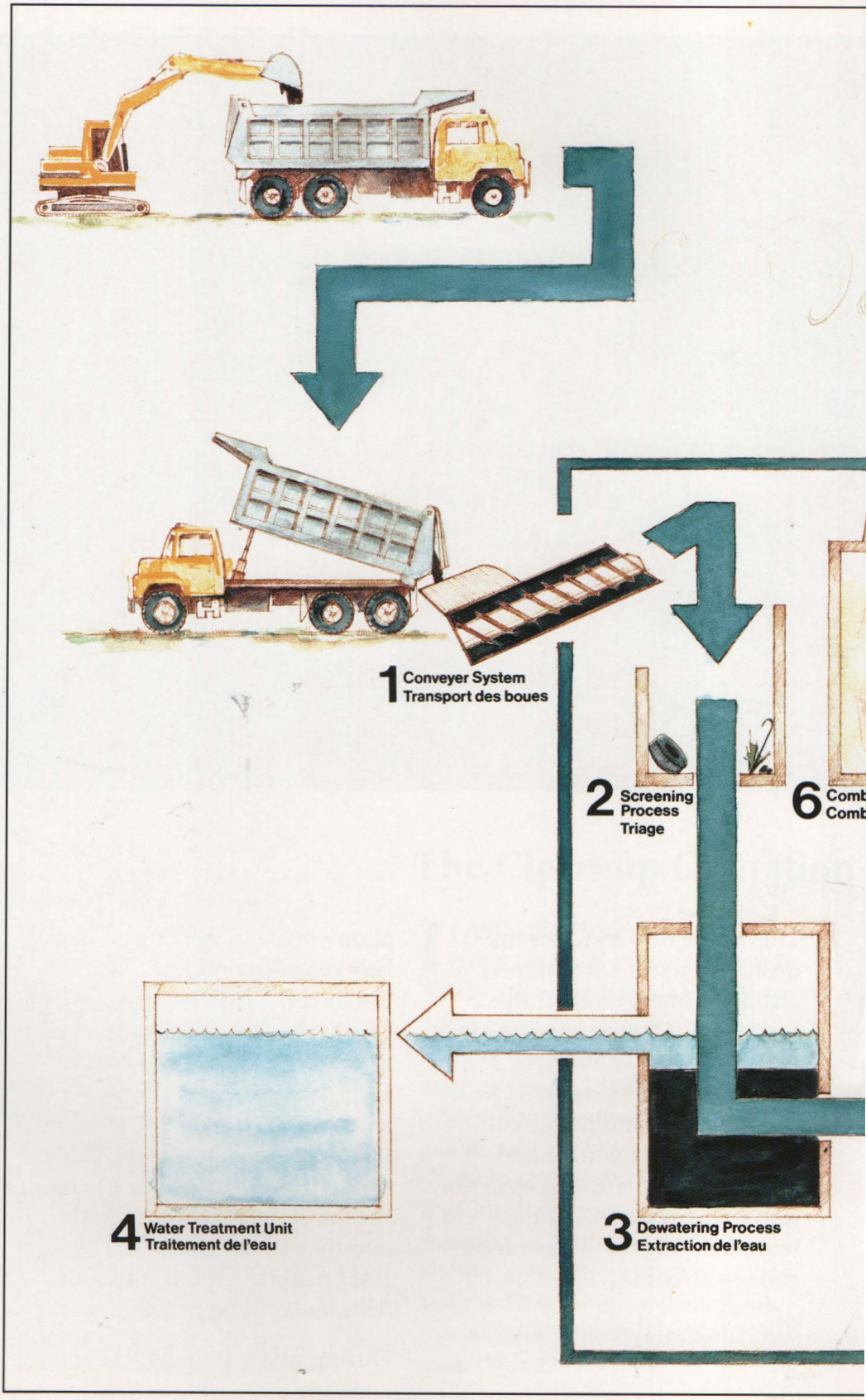
An aerial view of the dismantling of 13 decades-old abandoned coal tar storage tanks.

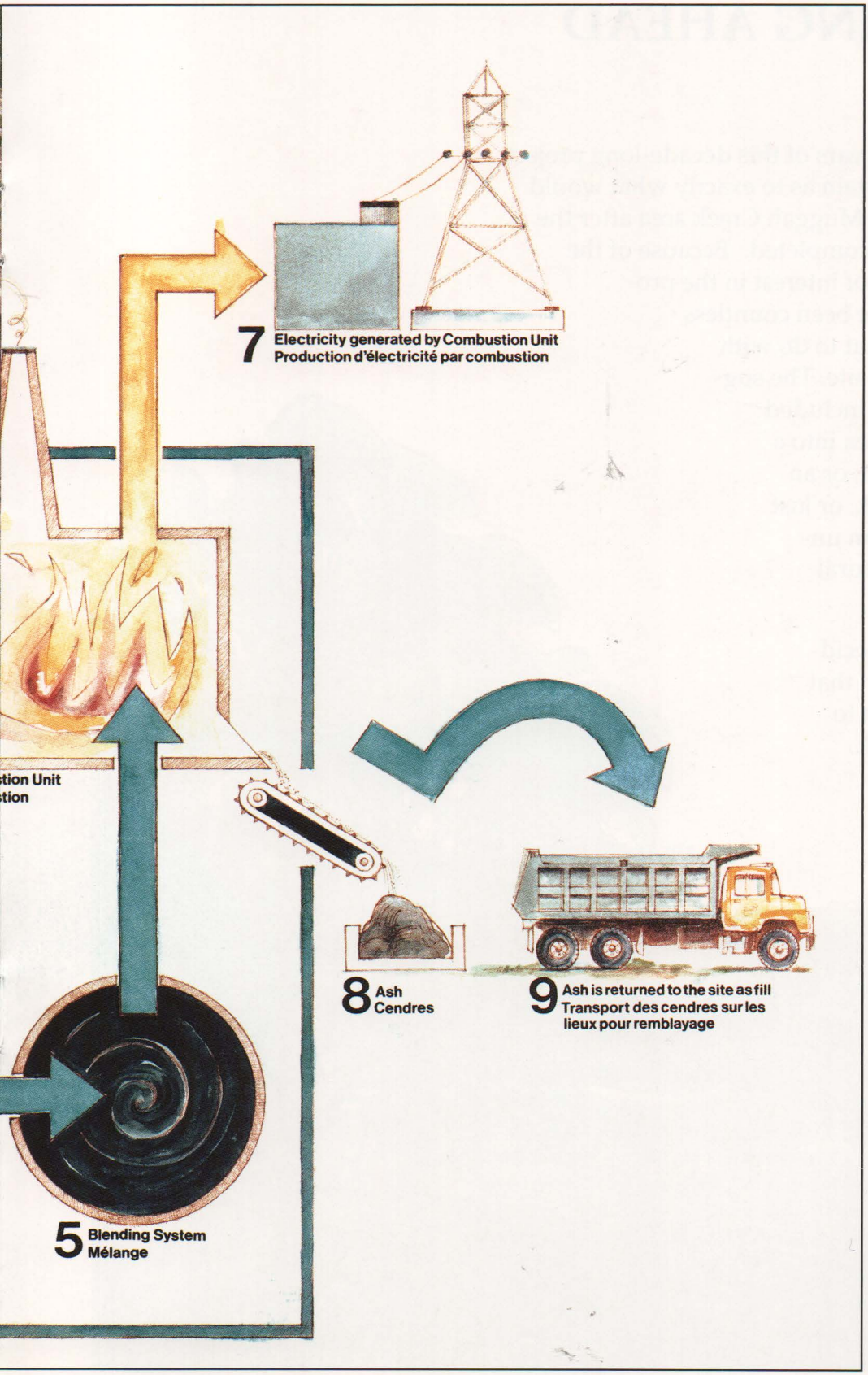
This phase also includes the destruction of 14 abandoned coal tar storage tanks at the Sysco site. During late 1987 and early 1988, the contents of 13 of the tanks were transferred to another tank; and then the 13 tanks were dismantled and removed. The substances in the remaining tank will be destroyed during the incineration process to come.

Phase two of the clean-up process—excavation and incineration—will take seven and one-half years to complete. The Tar Ponds contain an estimated 700 000 tonnes of sediment, about 3 400 tonnes of which is PAH material mixed in with sludge. In other words, it would take approximately 70 000 large dump truck loads to haul away the total contents of the ponds and the estimated amount of PAH material would fill about 350 similar sized trucks.

During phase two the PAH-contaminated sediments in the Tar Ponds will be excavated and then incinerated at an expected 99.99% rate of destruction of the toxic material. Constant monitoring of both the excavation and incineration of the Tar Ponds material will ensure that the PAHs do not re-enter the environment.

PHASES

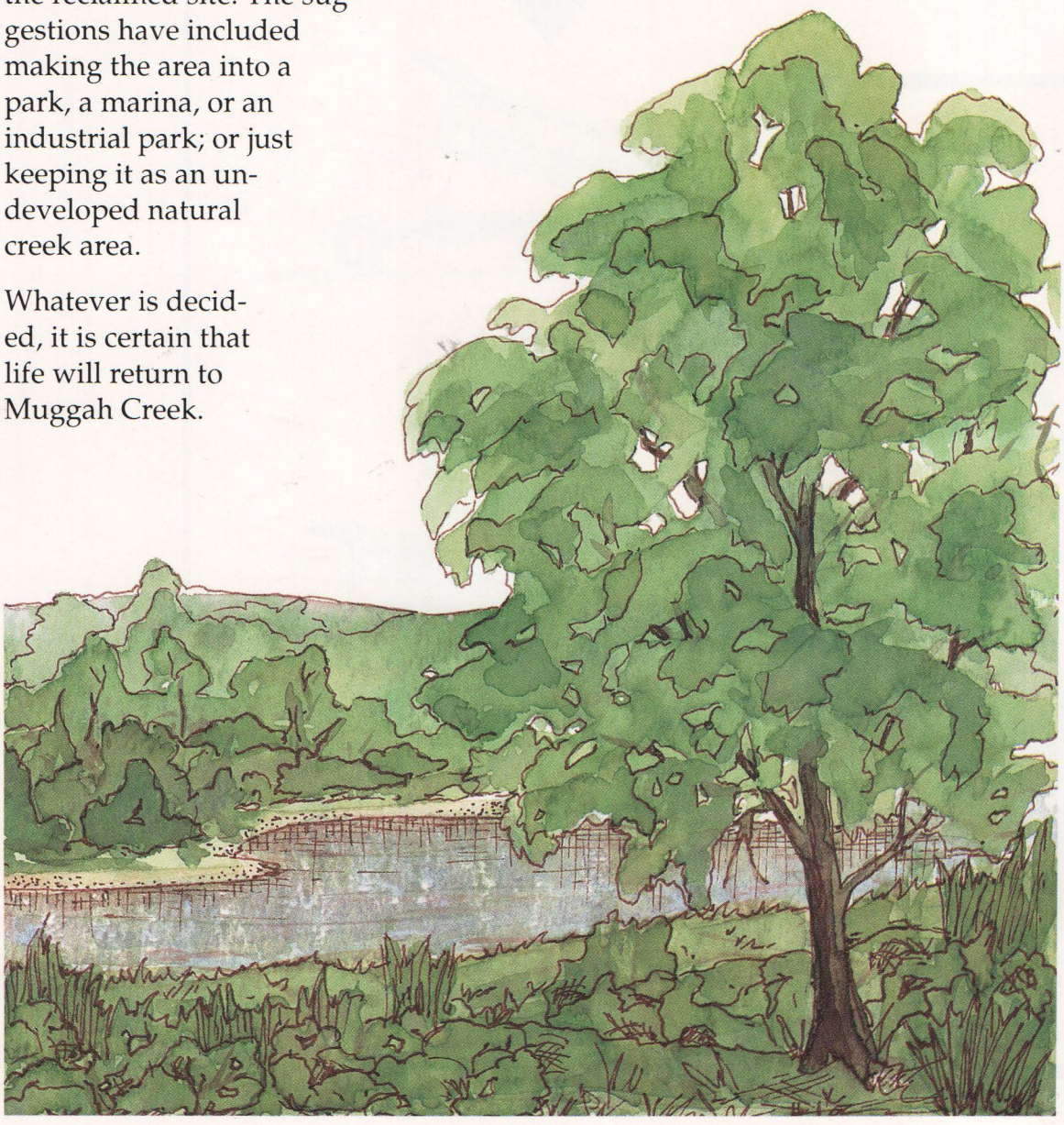

1 Conveyer System
Transport des boues
2 Screening
Process
Triage
6 Comb
Comb
4 Water Treatment Unit
Traitement de l'eau
3 Dewatering Process
Extraction de l'eau


7 Electricity generated by Combustion Unit
Production d'électricité par combustion
stion Unit
stion
8 Ash
Cendres
9 Ash is returned to the site as fill
Transport des cendres sur les lieux pour remblayage
5 Blending System
Mélange

LOOKING AHEAD

In the early years of this decade-long project, it was uncertain as to exactly what would happen to the Muggah Creek area after the clean-up was completed. Because of the great amount of interest in the project, there have been countless ideas as to what to do with the reclaimed site. The suggestions have included making the area into a park, a marina, or an industrial park; or just keeping it as an undeveloped natural creek area.

Whatever is decided, it is certain that life will return to Muggah Creek.



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